Reviewer's report

Title: A Body Shape Index and Body Roundness Index: Two new body indices to identify diabetes mellitus among rural populations in northeast China

Version: 3 Date: 11 June 2015

Reviewer: Martijn Maessen

Reviewer's report:

MAJOR REVISIONS:

1. General remarks
The order of the text can be improved throughout the manuscript. The main research aim is to assess the capacity of the ABSI and BRI to identify subjects with diabetes mellitus. Secondary aim is to determine whether ABSI and / or BRI is superior the traditional body indices (BMI, WC, WtHr). Keep this order throughout the manuscript.

For example, the order of the results could be:
- First, present the results of the ability of the ABSI and BRI to identify individuals with diabetes mellitus (Table 4)
- Second, present to results whether ABSI and / or BRI are superior to the traditional anthropometric measures (BMI, WC, WtHr) in identifying individuals with diabetes mellitus (Table 3)

2. ABSTRACT (Page 3)
The background is not focussed on study aim. It should be rewritten with a focus on diabetes mellitus instead of fat and lean body mass, since this is the aim of the study. Moreover, the study aim is not presented in the abstract.

3. METHODS
Methods have been described ok. Although, I have some points for consideration:
- What was the total amount of participants before the final sample size? In other words: how many participants were excluded from the study?
- It is not clear why participants below the age of 35 were excluded from the study.
- What is the definition of diabetes mellitus (i.e. how did you define “treated for diabetes”)? Also, do you consider both type 1 and 2 to be eligible for the study?
- Are participants who suffered from cardiovascular diseases or other morbidities excluded from the study? Please mention this in your paper.
- “Each measurement was categorized into quartiles”. Did the authors take into account sex influenced differences for WC [2] and ABSI [3] when creating
quartiles?

6. What was the reason the correlate FPG with the anthropometric measures? Also, it would be more informative to present the results in Figures with a reference line indicating the cut-off value for diabetes.

7. The odds ratios of the 4th quartile is presented, but the authors are advised to also present the other quartiles (similar as table 3 of [1]). Also, presenting the prevalence per quartile in a separate Table gives a good indication of the suitability of the anthropometric measures.

Additionally, I have some considerations for the statistical analysis:

1. The authors mention they assume normality, but why did the authors not check normality?

2. It is not clear to me why the authors examined differences between males and females. As I understand correctly, this is not part of their research aim. It is recommended that the authors compare diabetics and healthy controls and present these results accordingly.

3. The authors examined the relationship between diabetes mellitus and the anthropometric measures by using a linear regression model. This is however, in the results it is stated that the authors examined the relationship between FPG and the anthropometric measures. This should be revised.

A few considerations should be taken into account for the discussion:

• Page 14, paragraph 1 (ABSI):
  o The authors discuss that their study participants had a physical intensive lifestyle, which led to a higher deposition of muscular tissue, lower visceral adipose tissue, and consequently improved physical health. Did the authors measure these parameters and if so, why are results these results not presented in Table 1? Please not that if these parameters were not measured, the discussion is highly speculative.
  
  o The authors state that most participants were classified as obese. But it is not clear what group they mean: only diabetics or total group. (I think the latter). Also, it would be advisable to quantify the number of obese people.

• Page 15, paragraph 1 (BRI)
  o The authors should probably make note that the BRI is a one-to-one transformation of the WtHr, since both formulas comprise the same parameters. The quartiles would be exactly identical regardless of which of the two quantities is employed. However, the results do not show the quartiles and it would be informative to correlate the BRI with the WtHr.

MINOR ESSENTIAL REVISIONS

General remarks

• When an abbreviation (e.g. DM) is introduced, use it consistently throughout the manuscript and do not abbreviate the term again. Also, do not abbreviate words
if they are not used that much in the manuscript (e.g. DM (diabetes mellitus) Page 5, Paragraph 1, line 4 or blood pressure, methods, page 9, paragraph 2).

ABSTRACT (Page 3)
Methods and results:
• Abbreviation DM is used before it is explained that it is diabetes mellitus
• Add some numeric results (AUC) to the abstract, this gives more insight in the data

INTRODUCTION
Page 6, paragraph 1
• Line 3: typo “ANSI” should be ABSI.

METHODS
Page 7, paragraph 1
• What is the definition of ‘eligible residents’, what were the criteria to be eligible? Please specify.

Page 10, paragraph 1
• Line 7: please consider the order of words

DISCRETIONARY REVISIONS

METHODS
Page 8, paragraph 2
• Convert CNY to dollar, it makes the interpretation of family income easier for non-Chinese readers.

Page 10, paragraph 3
• Line 5; remove “appropriate” in “area under the appropriate receiver-operating characteristic curve”

Page 11, paragraph 1
• Line 1; remove “four” in “four quartiles”.

RESULTS
Page 12, paragraph 1
• Limit the decimals for AUC to two, instead of three.

REFERENCES
1. Maessen, M.F., et al., Entering a new era of body indices: the feasibility of a body shape index and body roundness index to identify cardiovascular health


**Level of interest:** An article whose findings are important to those with closely related research interests

**Quality of written English:** Needs some language corrections before being published

**Statistical review:** Yes, and I have assessed the statistics in my report.

**Declaration of competing interests:**

I declare that I have no competing interests